

Math Success with DMTI

WHEN MATH STICKS: THE COGNITIVE SCIENCE OF DURABLE LEARNING

In today's edition, we explore:

- How cognitive science unlocks lasting math understanding
- The role of memory, schemas, and meaningful learning in maximizing retention
- Practical classroom moves that help knowledge “stick” for a lifetime
- Tips to empower every learner and build mathematical confidence

Educators!

What makes some math learning fade quickly, and other learning last for years? Research shows the difference is not just more practice, but how we practice—by working with, not against, the way the brain encodes, organizes and retrieves ideas.

Cognitive science reveals that students develop a durable understanding of math by progressing from concrete experiences to visual models, and then to abstract symbols—just as Bruner described. Along the way, the brain organizes new knowledge into schemas. As Piaget’s theories of **assimilation (fitting new ideas into what we already know)** and **accommodation (reshaping our understanding to include new concepts)** show, meaningful learning occurs when students connect new math concepts to well-founded prior knowledge.

Durable learning also relies on intentionally managing cognitive load—avoiding memory overload in the early stages—and on key memory-strengthening strategies: retrieval practice, spaced review, and interleaved practice. These not only help ideas stick, but also make students ready to apply what they know in any situation.

Classroom Strategies for Success

Sequence experiences: Start learning with real objects or hands-on activities. Move to visual models (diagrams, number lines, bar models, area models), then formal mathematical symbols and procedures.

Promote schema growth: Encourage students to make connections and explain their thinking, helping them add to (“assimilate”) or rethink (“accommodate”) their prior knowledge.

Strengthen retrieval: Build in frequent, low-stakes retrieval practice—quizzes, exit tickets, think-pair-share—to activate and strengthen recall. Utilize spacing and “desirable difficulties” (*like mixing up problem types*) to combat the forgetting curve and enhance understanding.

Support productive struggle: Frame confusion and challenge as vital to growth. Scaffold tasks so students reflect, revise, and expand their schema in the face of new and challenging ideas.

Tips for Engagement and Equity

- Celebrate curiosity, effort, and flexible thinking, not just correct answers or speed
- Use manipulatives, visuals, and collaborative discourse to make thinking visible for all
- Connect math to real-world contexts to anchor memory and build meaning
- Assess growth with tasks that value reasoning, strategy, and adaptability—not just memorized answers
- Let us help every student experience math that really sticks!

Keep inspiring mathematical minds!

MORE INFORMATION

This newsletter is just a preview—there is more to explore! For the full research overview and additional videos, visit the “Research Overviews” page at dmtinstitute.com/research. You’ll find deeper insights, classroom strategies, downloadable resources, and more ways to expand your math teaching.

Have a classroom story, tip, or question to share? We love featuring educator voices and ideas. Email us at mathsuccess@dmtinstitute.com to contribute a teaching tip or share your experience—your story could be in our next newsletter!

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